Desktop TVC Learning Center

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Background

•Thrust Vector Control (TVC) systems are crucial to spaceflight
•TVC provides a way to steer a spacecraft on a desired trajectory
•Actuators are used to move the nozzles of the thrusters to obtain controlled flight.

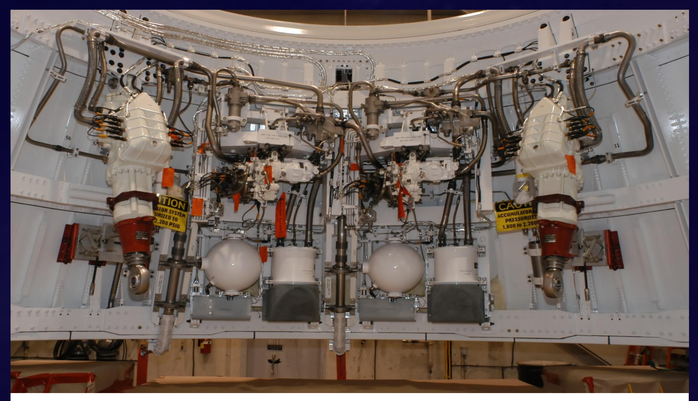
Design

System consists of:
•Dual axis inverted pendulum
•Two linear voice coil actuators
•Two tri-axial rate gyroscopes
•Two angular potentiometers
•PID controller with LabView

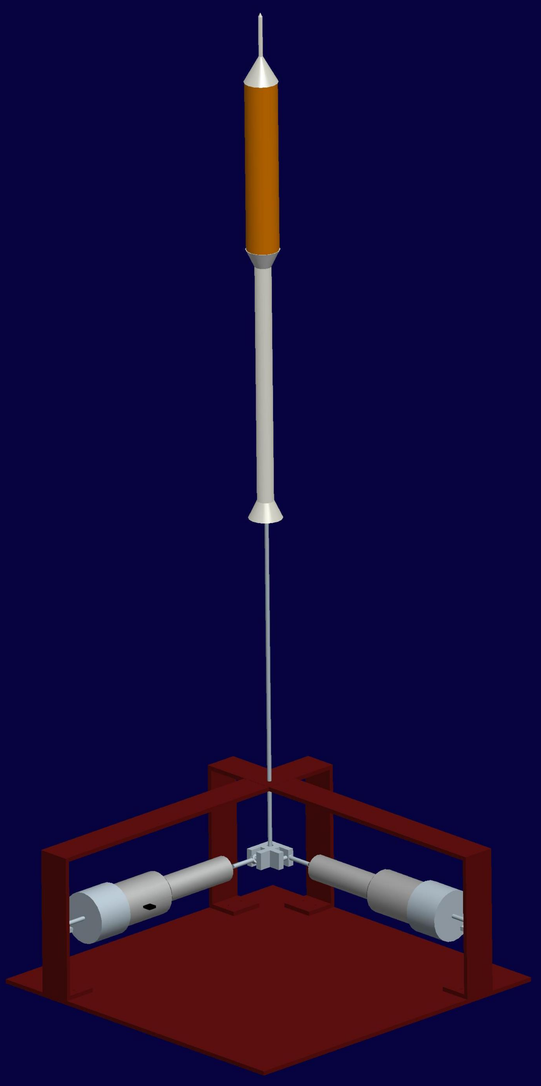
Purpose

Design and build demonstration system that visually explains:

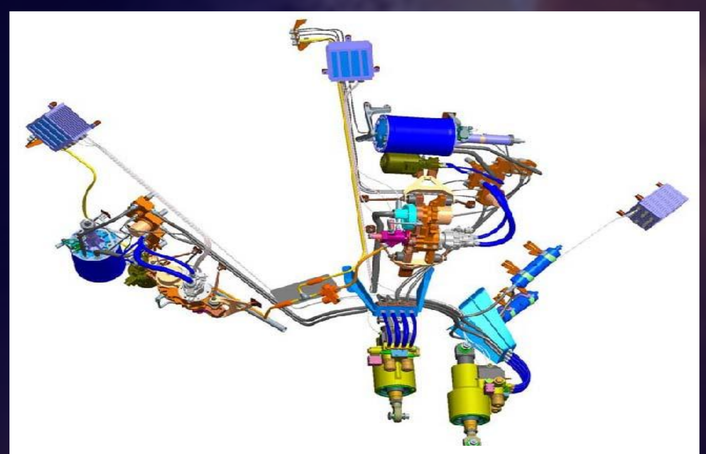
•The concept of TVC
•Importance to spaceflight
•How a TVC system works



Space Shuttle TVC System

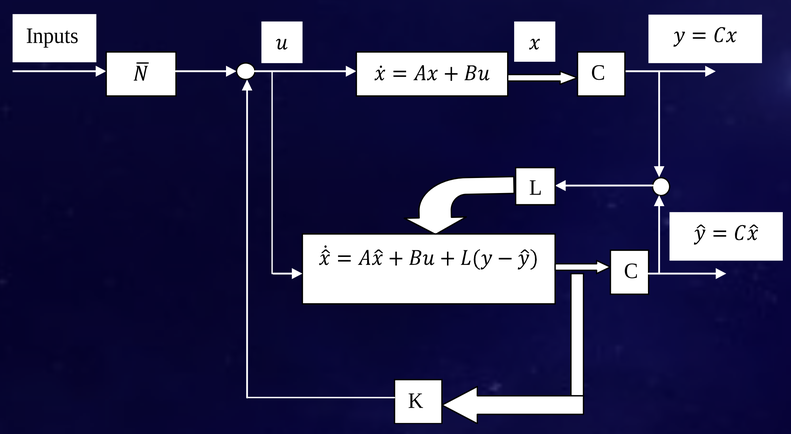


Pro-E System Design



Ares I Upper Stage TVC System

Control Diagram



State Space Response